

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method for performing mass spectrometry of sulfur atom-containing derivatives of an organic residue, characterized in that the method comprises ionizing a metal-organic residue complex into the derivatives, wherein the complex has the organic residue bound through a sulfur atom to the metal.

2. (Original) A method for performing mass spectrometry of a compound or salt thereof, characterized in that the method comprises ionizing a metal-organic residue complex into sulfur atom-containing derivatives, wherein the metal-organic residue complex is represented by the general formula (I)
$$(R-S)_n-M^1 \quad (I),$$
wherein R is an organic residue, S is a sulfur atom and n indicates a stoichiometric ratio of (R-S) group with respect to M^1 and is an integer equal to or greater than 1; and

wherein the compound is represented by the general formulae (II) and/or (III):

$R-SH \quad (II) \text{ and/or}$

$R-S-S-R \quad (III),$

wherein R and S are the same as defined above.

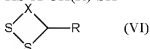
3. (Original) A method for performing mass spectrometry of a compound or salt thereof, characterized in that the method comprises ionizing a metal-organic residue complex into sulfur atom-containing derivatives, wherein the metal-organic residue complex is represented by the general formula (IV):

$M^1-S-X-CH(R)-S-M^1 \quad (IV),$

wherein R is an organic residue, S is a sulfur atom, M^1 at both ends are same metal entities, X is a lower alkylene or a lower alkenylene;

wherein the compound is represented by the general formulae (V) and/or (VI):

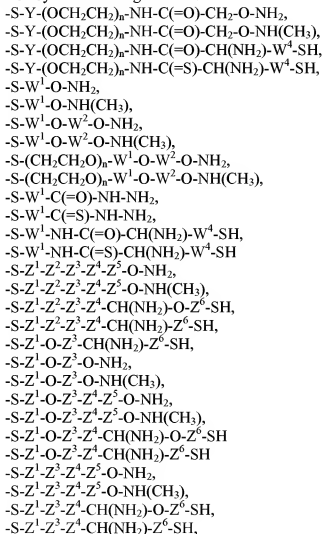
$HS-X-CH(R)-SH \quad (V) \text{ and/or}$



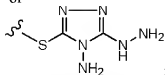
wherein R, S and X are the same as defined above.

4. (Original) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising the following steps of:

1) contacting a metal-organic residue complex with a sugar chain or a sugar chain-containing substance under the conditions where the metal-organic residue complex and the sugar chain or sugar chain-containing substance may react with each other, wherein the metal-organic residue complex contains a metal bound to a group represented by the following formula:



or



2) obtaining the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance; and

3) ionizing the metal-organic residue complex bound to the sugar chain or the sugar chain-containing substance into sulfur atom-containing derivatives of the organic residue.

5. (Original) A method according to any one of claims 1 to 4, wherein the metal has a surface enough to cause a diffuse reflection of a laser beam.

6. (Original) A method according to claim 5, wherein the metal is a fine metal particle.

7. (Currently Amended) A method according to any one of claims 1 to 4 and 6, wherein the metal is gold, silver, cadmium or selenium.

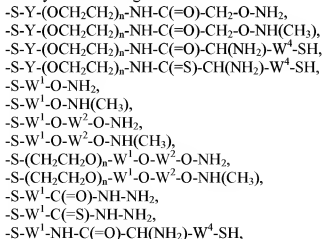
8. (Currently Amended) A method according to any one of claims 1 to 4 and 6, wherein the mass spectrometry is carried out by MALDI-TOF MS method.

9. (Original) A method according to any one of claims 1 to 3, wherein the organic residue is a group comprising a sugar chain or a sugar chain-containing substance.

10. (Original) A method for performing mass spectrometry of a sulfur atom-containing analyte comprising the steps of:

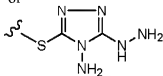
- 1) reacting tetrachloroauric acid with a sulfur atom-containing analyte in the presence of a reducing agent;
- 2) obtaining a gold-analyte complex particle which has the analyte bound through the sulfur atom to the gold; and
- 3) ionizing the obtained gold-analyte complex particles into a sulfur atom-containing analyte derivative.

11. (Original) A metal-organic residue complex containing a metal bound to a group represented by the following formula:



-S-W¹-NH-C(=S)-CH(NH₂)-W⁴-SH,
 -S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH₂,
 -S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH(CH₃),
 -S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-O-Z⁶-SH,
 -S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-Z⁶-SH,
 -S-Z¹-O-Z³-CH(NH₂)-Z⁶-SH,
 -S-Z¹-O-Z³-O-NH₂,
 -S-Z¹-O-Z³-O-NH(CH₃),
 -S-Z¹-O-Z³-Z⁴-Z⁵-O-NH₂,
 -S-Z¹-O-Z³-Z⁴-Z⁵-O-NH(CH₃),
 -S-Z¹-O-Z³-Z⁴-CH(NH₂)-O-Z⁶-SH
 -S-Z¹-O-Z³-Z⁴-CH(NH₂)-Z⁶-SH
 -S-Z¹-Z³-Z⁴-Z⁵-O-NH₂,
 -S-Z¹-Z³-Z⁴-Z⁵-O-NH(CH₃),
 -S-Z¹-Z³-Z⁴-CH(NH₂)-O-Z⁶-SH,
 -S-Z¹-Z³-Z⁴-CH(NH₂)-Z⁶-SH,

or



wherein, Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

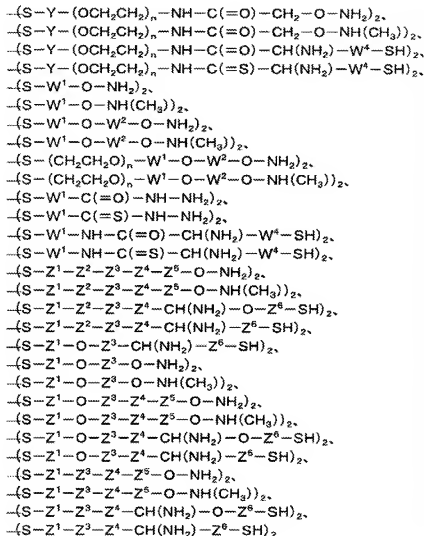
Z³ and Z⁵ are independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

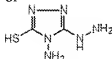
Z⁶ is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

12. (Original) A method for producing metal-organic residue complex particles, wherein the method comprises reacting tetrachloroauric acid with a compound represented by the following formula:

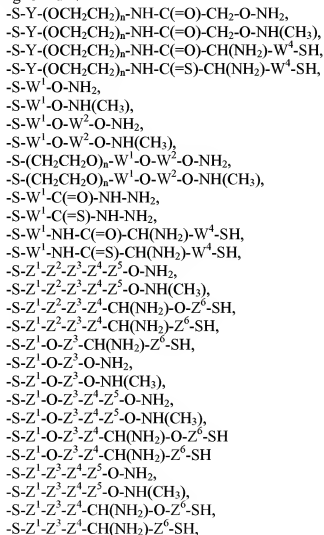


or

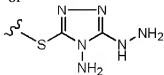


, or a salt thereof, in the presence of a reducing agent,
 wherein, Y, W¹ and W² are independently C1-C12 alkylene,
 C2-C12 alkenylene or C2-C12 alkynylene;
 W⁴ is C1-C2 alkylene;
 Z¹ is substituted or unsubstituted arylene or heteroarylene;
 Z² is a nitrogen-containing heterocycle;
 Z³ and Z⁵ are independently C1-C12 alkylene;
 Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;
 Z⁶ is C1-C2 alkylene; and
 n is an integer between 1 and 10, inclusive.

13. (Original) A method for trapping a sugar chain or a sugar chain-containing substance, characterized in that the method comprises contacting a metal-organic residue complex with a sugar chain or a sugar chain-containing substance, under conditions where the metal-organic residue complex and the sugar chain or the sugar chain-containing substance may react with each other, the metal-organic residue complex has a metal bound to a group represented by the following formula:



or



wherein, Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

Z³ and Z⁵ are independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

Z⁶ is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

14. (Original) A method for measuring the molecular weight of a substance which may interact with an organic residue of a metal-organic residue complex, comprising the steps of:

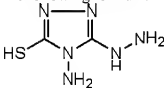
1) contacting the metal-organic residue complex with a substance which may interact with the organic residue, wherein the metal is bound through a sulfur atom to organic residue;

2) obtaining the metal-organic residue complex bound to the substance which may interact; and

3) ionizing the obtained metal-organic residue complex into derivatives of the organic residue, wherein the organic residue contains a sulfur atom.

15. (Original) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising the steps of:

1) contacting a compound with a metal, wherein the compound is represented by the following formula:

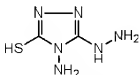


2) contacting the metal-organic residue complex obtained in 1) with a sugar chain or a sugar chain-containing substance under conditions where the metal-organic residue complex and the sugar chain or the sugar chain-containing substance may react with each other; and

3) ionizing the metal-organic residue complex obtained in 2) into derivatives of the organic residue, wherein the organic residue contains a sulfur atom.

16. (Original) A method for performing mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising the steps of:

1) contacting a compound represented by the following formula:

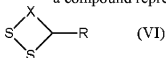


with a sugar chain or a sugar chain-containing substance under conditions where the compound and the sugar chain or the sugar chain-containing substance may react with each other;

- 2) contacting the compound obtained in 1) with a metal; and
- 3) ionizing the metal-organic residue complex obtained in 2) into derivatives of the organic residue, wherein the organic residue contains a sulfur atom.

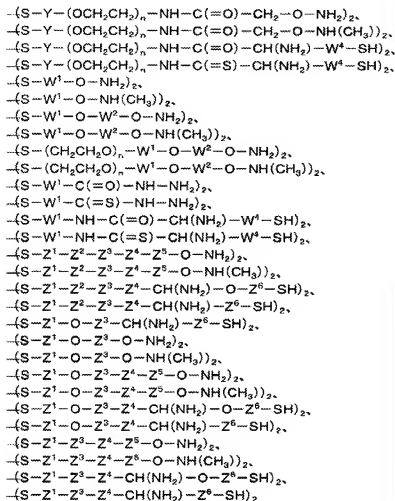
17. (Original) A composition for trapping a sugar chain, comprising:

- a compound represented by the general formula (II):
 $R-SH$ (II) or a salt thereof, wherein R is an organic residue; and S is a sulfur atom;
- a compound represented by the general formula (III):
 $R-S-S-R$ (III) or a salt thereof, wherein, R and S are the same as defined above;
- a compound represented by the general formula (V):
 $HS-X-CH(R)-SH$ (V) or a salt thereof, wherein R and S are the same as defined above; and X is lower alkylene or lower alkenylene; or
- a compound represented by the general formula (VI):

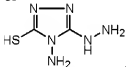


or a salt thereof, wherein, R, S and X are the same as defined above; or a mixture thereof.

18. (Currently Amended) A composition for trapping a sugar chain, comprising a wherein the compound is represented by the following formula:



or



wherein Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;

Z¹ is substituted or unsubstituted arylene or heteroarylene;

Z² is a nitrogen-containing heterocycle;

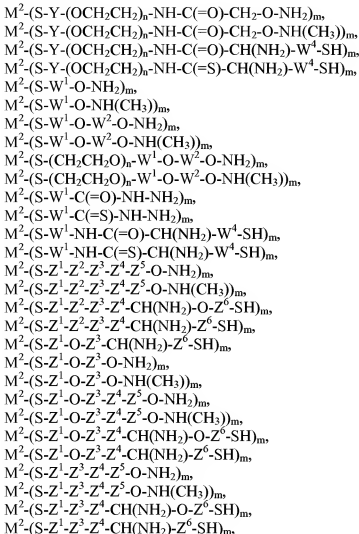
Z³ and Z⁵ are independently C1-C12 alkylene;

Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;

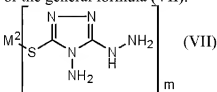
Z⁶ is C1-C2 alkylene; and

n is an integer between 1 and 10, inclusive.

19. (Original) A metal-organic residue complex represented by the following formula:



or the general formula (VII):



wherein, M^2 is a metal;
 m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than 1, wherein the organic residue contains a sulfur atom;
 Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;
 W^4 is C1-C2 alkylene;

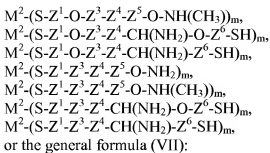
Z^1 is substituted or unsubstituted arylene or heteroarylen ;
 Z^2 is a nitrogen-containing heterocycle;
 Z^3 and Z^5 are independently C1-C12 alkylene;
 Z^4 is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;
 Z^6 is C1-C2 alkylene; and
 n is an integer between 1 and 10, inclusive.

20. (Original) A composition for trapping a sugar chain, comprising: a metal-organic residue complex represented by the general formula (I):
 $(R-S)_n-M^1$ (I),
 wherein R is an organic residue; S is a sulfur atom; M^1 is a metal; and n indicates a stoichiometric ratio of (R-S) group with respect to M^1 and is an integer equal to or greater than 1; or

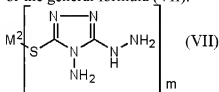
a metal-organic residue complex represented by the general formula (IV):
 $M^1-S-X-CH(R)-S-M^1$ (IV),
 wherein R and S are the same as defined above, M^1 at both ends are a metal of the same substance and X is lower alkylene or lower alkenylene.

21. (Currently Amended) ~~A~~ The composition of claim 20 for trapping a sugar chain, comprising a wherein the metal-organic residue complex is represented by the following formula:

$M^2-(S-Y-(OCH_2CH_2)_n-NH-C(=O)-CH_2-O-NH_2)_m$,
 $M^2-(S-Y-(OCH_2CH_2)_n-NH-C(=O)-CH_2-O-NH(CH_3))_m$,
 $M^2-(S-Y-(OCH_2CH_2)_n-NH-C(=O)-CH(NH_2)-W^4-SH)_m$,
 $M^2-(S-Y-(OCH_2CH_2)_n-NH-C(=S)-CH(NH_2)-W^4-SH)_m$,
 $M^2-(S-W^1-O-NH_2)_m$,
 $M^2-(S-W^1-O-NH(CH_3))_m$,
 $M^2-(S-W^1-O-W^2-O-NH_2)_m$,
 $M^2-(S-W^1-O-W^2-O-NH(CH_3))_m$,
 $M^2-(S-(CH_2CH_2O)_n-W^1-O-W^2-O-NH_2)_m$,
 $M^2-(S-(CH_2CH_2O)_n-W^1-O-W^2-O-NH(CH_3))_m$,
 $M^2-(S-W^1-C(=O)-NH-NH_2)_m$,
 $M^2-(S-W^1-C(=S)-NH-NH_2)_m$,
 $M^2-(S-W^1-NH-C(=O)-CH(NH_2)-W^4-SH)_m$,
 $M^2-(S-W^1-NH-C(=S)-CH(NH_2)-W^4-SH)_m$,
 $M^2-(S-Z^1-Z^2-Z^3-Z^4-Z^5-O-NH_2)_m$,
 $M^2-(S-Z^1-Z^2-Z^3-Z^4-Z^5-O-NH(CH_3))_m$,
 $M^2-(S-Z^1-Z^2-Z^3-Z^4-CH(NH_2)-O-Z^6-SH)_m$,
 $M^2-(S-Z^1-Z^2-Z^3-Z^4-CH(NH_2)-Z^6-SH)_m$,
 $M^2-(S-Z^1-O-Z^3-CH(NH_2)-Z^6-SH)_m$,
 $M^2-(S-Z^1-O-Z^3-O-NH_2)_m$,
 $M^2-(S-Z^1-O-Z^3-O-NH(CH_3))_m$,
 $M^2-(S-Z^1-O-Z^3-Z^4-O-NH_2)_m$,



or the general formula (VII):



wherein,

M^2 is a metal;

m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than 1, wherein the organic residue comprises a sulfur atom; Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W^4 is C1-C2 alkylene;

Z^1 is substituted or unsubstituted arylene or heteroarylene;

Z^2 is a nitrogen-containing heterocycle;

Z^3 and Z^5 are independently C1-C12 alkylene;

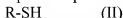
Z^4 is $-O-C(=O)$, $-O-C(=S)$, $-NH-C(=O)$, $-NH-C(=S)$, $-O-$ or $-S-$;

Z^6 is C1-C2 alkylene and

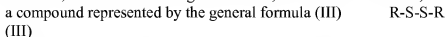
n is an integer between 1 and 10, inclusive.

22. (Original) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

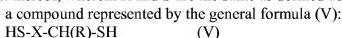
A) a compound represented by the general formula (II):



or a salt thereof, wherein R is an organic residue; and S is a sulfur atom;

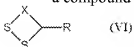


or a salt thereof, wherein R and S are the same as defined above;



or a salt thereof, wherein R and S are the same as defined above; and X is lower alkylene or lower alkenylene; or

a compound represented by the general formula (VI):

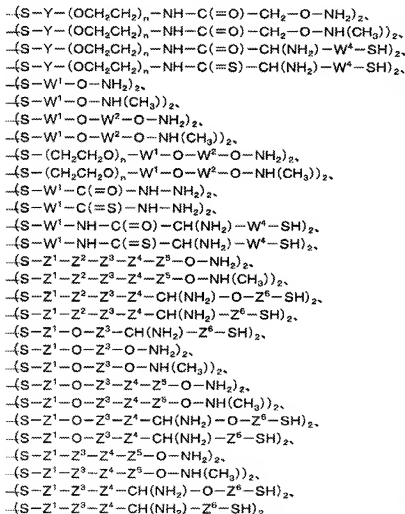


or a salt thereof, wherein R, S and X are the same as defined above; or a mixture thereof;
 and

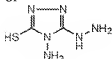
B) a metal.

23. (Original) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

A) a sulfur atom containing derivatives of an organic residue, represented by the following formula:



or



wherein Y, W¹ and W² are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene;

W⁴ is C1-C2 alkylene;
 Z¹ is substituted or unsubstituted arylen or heteroarylen;
 Z² is a nitrogen-containing heterocycle;
 Z³ and Z⁵ are independently C1-C12 alkylene;
 Z⁴ is -O-C(=O), -O-C(=S), -NH-C(=O), -NH-C(=S), -O- or -S-;
 Z⁶ is C1-C2 alkylene; and
 n is an integer between 1 and 10, inclusive; and
 B) a metal.

24. (Original) A kit for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising:

a metal-organic residue complex represented by the general formula (I):
 (R-S)_n-M¹ (I)

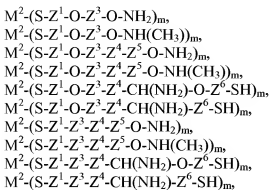
wherein, R is an organic residue, S is a sulfur atom, M¹ is a metal and n indicates a stoichiometric ratio of (R-S) group with respect to M¹ and is an integer equal to or greater than 1; or

a metal-organic residue complex represented by the general formula (IV):
 M¹-S-X-CH(R)-S-M¹ (IV)

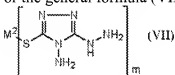
wherein R and S are the same as defined above, M¹ at both ends are same metal entities and X is lower alkylene or lower alkenylene.

25. (Currently Amended) ~~A-The kit of claim 24 for mass spectrometry of a sugar chain or a sugar chain-containing substance, comprising a wherein the metal-organic residue complex, is represented by the following formula:~~

M²-(S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH₂-O-NH₂)_m,
 M²-(S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH₂-O-NH(CH₃)_m,
 M²-(S-Y-(OCH₂CH₂)_n-NH-C(=O)-CH(NH₂)-W⁴-SH)_m,
 M²-(S-Y-(OCH₂CH₂)_n-NH-C(=S)-CH(NH₂)-W⁴-SH)_m,
 M²-(S-W¹-O-NH₂)_m,
 M²-(S-W¹-O-NH(CH₃)_m,
 M²-(S-W¹-O-W²-O-NH₂)_m,
 M²-(S-W¹-O-W²-O-NH(CH₃)_m,
 M²-(S-(CH₂CH₂O)_n-W¹-O-W²-O-NH₂)_m,
 M²-(S-(CH₂CH₂O)_n-W¹-O-W²-O-NH(CH₃)_m,
 M²-(S-W¹-C(=O)-NH-NH₂)_m,
 M²-(S-W¹-C(=S)-NH-NH₂)_m,
 M²-(S-W¹-NH-C(=O)-CH(NH₂)-W⁴-SH)_m,
 M²-(S-W¹-NH-C(=S)-CH(NH₂)-W⁴-SH)_m,
 M²-(S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH₂)_m,
 M²-(S-Z¹-Z²-Z³-Z⁴-Z⁵-O-NH(CH₃)_m,
 M²-(S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-O-Z⁶-SH)_m,
 M²-(S-Z¹-Z²-Z³-Z⁴-CH(NH₂)-Z⁶-SH)_m,
 M²-(S-Z¹-O-Z³-CH(NH₂)-Z⁶-SH)_m,



or the general formula (VII):



wherein, M^2 is a metal, m indicates a stoichiometric ratio of an organic residue with respect to M^2 and is an integer equal to or greater than one, the organic residue comprises a sulfur atom, Y , W^1 and W^2 are independently C1-C12 alkylene, C2-C12 alkenylene or C2-C12 alkynylene, W^4 is C1-C2 alkylene;

Z^1 is substituted or unsubstituted arylene or heteroarylene;

Z^2 is a nitrogen-containing heterocycle, Z^3 and Z^5 are independently C1-C12 alkylene,

Z^4 is $-O-C(=O)$, $-O-C(=S)$, $-NH-C(=O)$, $-NH-C(=S)$, $-O-$ or $-S-$, Z^6 is C1-C2 alkylene;

and

n is an integer between 1 and 10, inclusive.

26. (Currently Amended) A method according to any one of claims 1 to 4 and 6, wherein the mass spectrometry is carried out by LDI-TOF MS method.
27. (Original) A method according to claim 10, wherein the mass spectrometry is carried out by LDI-TOF MS method.
28. (New) A method according to claim 5, wherein the metal is gold, silver, cadmium or selenium.
29. (New) A method according to claim 5, wherein the mass spectrometry is carried out by MALDI-TOF MS method.
30. (New) A method according to claim 5, wherein the mass spectrometry is carried out by LDI-TOF MS method.